

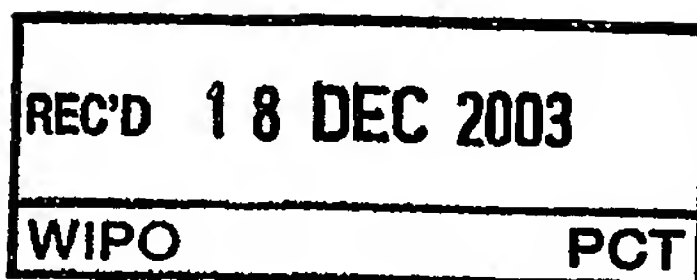


PCT/IB 03 / 05917

12.12.03



INVESTOR IN PEOPLE



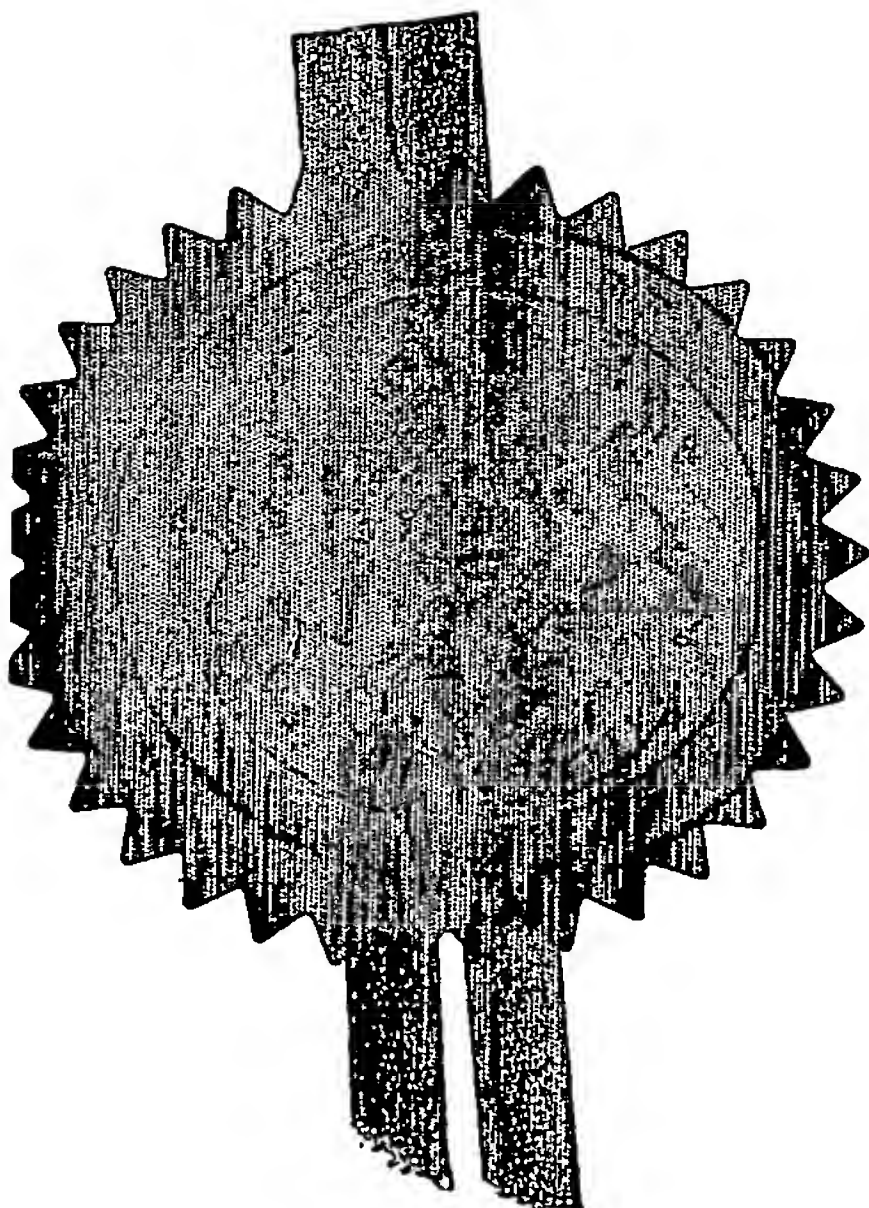
The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.



Signed

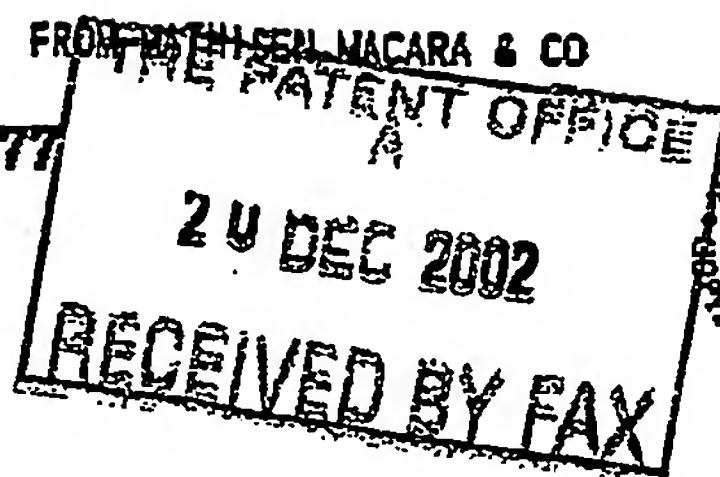
Andrew Goring

Dated 25 November 2003

PRIORITY DOCUMENT
SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH
RULE 17.1(a) OR (b)

BEST AVAILABLE COPY

Patents Form 1/77

Patents Act 1977
(Rule 16)20DEC02 E772480-1 002955
P01/7700 0.00-0229652.3**Request for grant of a patent**

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
South Wales
NP10 8QQ

1. Your reference

24/PP32665GB

2. Patent application number

(The Patent Office will fill in this part)

0229652.3

20 DEC 2002

3. Full name, address and postcode of the or of each applicant (underline all surnames)

GENCORP PROPERTY INC.
P O Box 537012
Sacramento, California 95853-7012
USA

Patents ADP number (if you know it)

8068900001

If the applicant is a corporate body, give the country/state of its incorporation

California, USA

4. Title of the invention

FIXING OF SEALING AND MOUNTING STRIPS TO MEMBERS

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

MATHISEN & MACARA
The Coach House
6-8 Swakeleys Road
Ickenham, Uxbridge
UB10 8BZ

Patents ADP number (if you know it)

1394001

8188245001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

YES

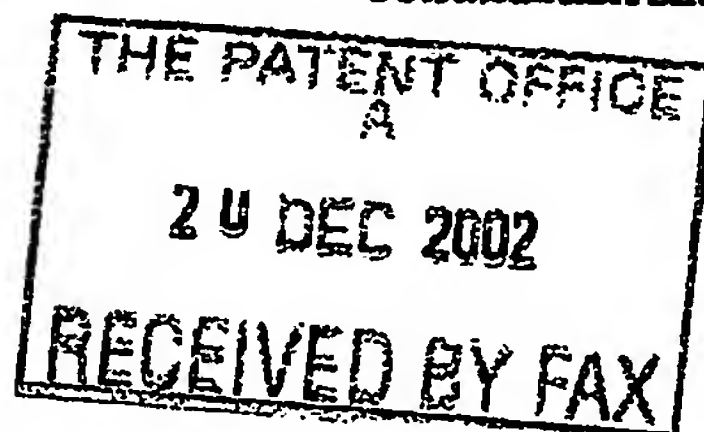
- a) any applicant named in part 3 is not an inventor, or
 - b) there is no inventor who is not named as an applicant, or
 - c) any named applicant is a corporate body.
- See note (d))

Patents Form 1/77

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form



Description

8 ✓

Claim(s)

5 ✓

Abstract

1 ✓

Drawing(s)

5 ✓

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

1 ✓

Request for substantive examination (Patents Form 10/77)

Any other documents
(please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

Mathisen & Macara

Date

20 DECEMBER 2002

12. Name and daytime telephone number of person to contact in the United Kingdom

MARK C FOSTER

01895 678331

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 08459 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- Once you have filled in the form you must remember to sign and date it.
- For details of the fee and ways to pay please contact the Patent Office.

Patents Form 1/77

FIXING OF SEALING AND MOUNTING STRIPS TO MEMBERS

The invention relates to sealing and mounting strips for sealing around members — for example, vehicle closure members, such as doors.

According to a first aspect of the present invention, there is provided a method of forming a sealing or mounting strip on a member, the method including providing a fixed extrusion device for producing an extruded sealing or mounting strip, moving the member with respect to the fixed extrusion device, while operating the extrusion device to produce the extruded sealing or mounting strip, such that the sealing or mounting strip is formed along a desired path on the member.

According to a second aspect of the present invention, there is provided the method of manufacturing an assembly, the method including forming the main body portion of the assembly; mounting the assembly on movement apparatus and moving the assembly to respective processing stations, at each of which a manufacturing step of the assembly is performed, wherein at one of said processing stations a sealing or mounting strip is formed on the assembly by a fixed extrusion device, and, while operating the extrusion device to produce the extruded sealing or mounting strip, the sealing or mounting strip is formed along a desired path on the assembly by controlled movement of the assembly with respect to the fixed extrusion device by the movement apparatus.

According to a third aspect of the present invention, there is provided apparatus for forming a sealing or mounting strip on a member, the apparatus including a fixed extrusion device and moving means onto which the member is mounted in use for moving the member with respect to the fixed extrusion device such that the strip is formed along a desired path on the member.

A method of forming a sealing or mounting strip, a method of manufacturing an assembly and apparatus for forming a sealing or mounting strip will now be described by way of example with reference to the accompanying diagrammatic drawings in which:

Figure 1 is a perspective view of a motor vehicle door;

Figure 2 shows the motor vehicle door of Figure 1 mounted for having a sealing or mounting strip formed thereon by a fixed extrusion device;

Figure 3 shows an enlarged view the area A of Figure 1 to which the fixed extrusion device is applying the sealing or mounting strip;

Figure 4 shows a cross-section through a sealing strip formed on a door; and

Figure 5 shows a cross-section through a mounting strip formed on a door to which a sealing strip is fixed.

In the figures like elements are generally designated with the same reference numeral.

Figure 1 shows a perspective view of a conventional motor vehicle body door 4, a front door in this example which is supported by hinges 5 and 6 its leading edge, a conventional check strap 8 being positioned between the hinges. The seal for sealing between the periphery of the door and the door opening (not shown) in the motor vehicle main body is mounted on the peripheral edge of the door as shown by the chain-dotted line 10. As shown, the path of the seal passes inside (that is, nearer to the inside face of the door than the outside face thereof) of the hinges 5 and 6 and the check strap 8. At the trailing edge of the door, there is a recess 12 for receiving that

part of the door latching and locking mechanism which is mounted on the vehicle body itself, and the path of the door seal 10 passes outside this recess.

The door seal is positioned on the door so as to run completely or substantially completely around the periphery of the door as shown in Figure 1. As shown in Figure 1, the position of the door seal on the door varies around the periphery of the door. It is advantageous for the door seal to pass inside the door hinges 5 and 6, rather than outside these items, in order to prevent trapping when the door is opened. It is advantageous for the seal to pass outside the locking mechanism recess 12 in order to allow the striker etc mechanism on the door frame to pass into the recess 12 when the door is closed. In general, however, the door seal is mounted close to the outside of the door so as to act between this relatively outer part of the door and the corresponding part of the door opening when the door is closed. Such relatively outward positioning of the door seal has a number of advantages: thus, it keeps the outer parts of the door aperture relatively clean, by sealing them against the ingress of air-borne dirt and moisture and in this respect is advantageous compared with the more inboard seal positioning which occurs with the type of door seal mounted not on the door itself but on the flange running around the door opening. In addition, the relatively outward positioning of the door seal described is of advantage in reducing wind noise.

In accordance with an aspect of this invention, the seal is formed by extruding an appropriate material, such as synthetic resin, rubber or the like, directly onto the periphery 9 of the door 4.

Figure 2 shows an extrusion device 15 for applying the seal to the door 4. The extrusion die 15 comprises an extrusion port 17 from which extrudate is expelled in a controlled manner to form the seal with the desired properties, a main body 19 and an extrudate material supply passage 21 to which extrudate is supplied from an

external source (not shown). The extrusion die 15 (including the extrusion port 17 and main body 19) are fixed in position. That is, the extrusion die 15 does not move. In the embodiment, the fixing of the extrusion die 15 is provided by attaching the main body 19 of the extrusion die 15 to the floor 23 of the plant in which the seal is being applied to the door 4. The main body 19 is fixed to the floor 23 by means of supporting legs 25. Of course, it should be appreciated that the extrusion die may be fixed in position by any other suitable means to any other suitable fixed surface or member.

The seal is formed in the desired position shown by the chain-dotted line 10 around the periphery 9 of the door 4 by moving the door 4 with respect to the fixed extrusion die 15. The door 4 is mounted in a frame 27 which clamps the door 4 at four spaced apart positions around the door's edge. The frame 27 is movable by any suitable means (not shown), such as by a robot typically used in automated vehicle fabrication plants. Of course, any other suitable movement means may be employed. The frame 27 is freely rotatable and translatable by the movement means. The movement means is capable accurately positioning the door with respect to the extrusion die 15 in order to allow for precise positioning of the seal on the periphery 9 of the door 4.

The door 4 is formed from two principal metal panels, an outer generally flat panel 28A, which forms the exterior surface of the door when mounted on the vehicle body, and an inner panel 28B comprising the periphery 9, which extends generally perpendicular to the exterior surface, and a generally planar interior surface of the door which lies generally parallel to the exterior surface. This interior surface typically has one or more openings in it to allow the components of the door to be fitted, such as the interior door handle 29, window winding apparatus (not shown), audio loudspeakers (not shown), etc. The outer and inner panels of the door 4 are attached together by any suitable means, such as by folding excess material at the edge of the outer panel tightly over the edge of the inner panel and welding the panels together.

Once the main body (comprising the outer and inner panels) of the door 4 is formed, the door is mounted on the frame 27. With the door 4 mounted in this manner, the door may be moved around the production plant by suitable movement means to various different areas within the production plant, at which various steps in the production of the finished door are performed. For example, the door, supported on the frame 27, may pass to an area within the production plant at which the door 4 is painted. The door 4 may then pass to an area where the door mirror 31 is fitted, to another area where the strap 8 is fitted, etc.

Such automated movement of a door 4 supported by a frame 27, or other suitable means, is typically employed in the manufacturing process of vehicle doors, and other vehicle body components.

In accordance with the present invention, a fixed extrusion die 15 can be used to apply the seal around the periphery 9 of the door 4 because movement of the door 4 is provided by movement of the frame 27 to which the door 4 is attached. In prior art methods of extruding a seal onto a door 4, the door has been held fixed whilst a moving extrusion die 15 travels around the periphery of the door 4 applying the seal thereto.

A movable extrusion die is more complex, more costly and less reliable than a fixed extrusion die. Provision has to be made to supply extrudate material to the moving extrusion die by means of flexible supply pipes.

According to the embodiment of the present invention being described, these disadvantages are obviated by employing a fixed extrusion die 15. By making use of the frame 27 and movement means already provided in a conventional automated vehicle fabrication plant, little or no additional cost is incurred by providing for movement of the door 4 with respect to the fixed extrusion die 15. The arrangement

of the embodiment is additionally advantageous because, at the time of formation of the seal, the step of removing the door 4 from the frame 27 is avoided, as is the step of re-attaching the door 4 to the frame 27.

Figure 3 shows in more detail the area A of the door 4 encircled in Figure 1 as the door 4 is moved with respect to the extrusion port 17. A continuous line of extrudate 33 is formed at the desired position on the periphery 9 of the door. The nozzle 35 of the extrusion port 17 provides the extruded material 33 with the desired shape.

Figure 4 shows a cross-section through the door periphery 9 and the seal 37 formed by the extruded material 33. The seal 37 may comprise a tubular sealing part 39 having a hollow central area 41, and an integral, generally planar base portion 43 which is attached by the extrusion process to the periphery 9 of the door 4. The base part 43 may be formed to have a high rigidity relative to the sealing part 39. This provides for secure fixing and locating of the seal 37 onto the periphery 9 of the door 4. The relative softness of the sealing part 39 provides for effective sealing against the opening of the vehicle body against which the sealing part 39 will be compressed when the door 4 is shut in use.

The precise form of the seal and the type of extrusion process to form the seal may be selected from the many known types of seal and extrusion processes.

Figure 5 shows an alternative embodiment in which the extrusion die 15 has been modified to form a continuous mounting strip 43 around the periphery 9 of a door 4. Like the first embodiment, the extrusion die 15 is fixed, and the door 4 is moved with respect to the fixed extrusion die 15. The mounting strip 43 comprises a bar 45 extending generally perpendicularly to the periphery 9 of the door 4 and an integral enlarged head portion 47. The mounting strip 43 is generally T-shaped. The base of the bar 45 is extruded onto the periphery 9.

The mounting strip 43 allows for the subsequent mounting of a sealing strip 49 around the periphery 9 of the door 4 by engaging the sealing strip 49 with the mounting strip 45.

The sealing strip 49 of Figure 5 comprises a relatively soft tubular portion 51 defining a hollow space 53, which act in a similar manner to the sealing part 39 and hollow space 41 of the seal 37 shown in Figure 4. The sealing part 51 is mounted on a relatively rigid base 55. From the opposite side of the base 55 extend two opposing resiliently deformable gripping lips 56. The base 55 and the lips 56 form a recess 58 sized to accommodate the head 47 of the mounting strip 43. The sealing strip 49 is mounted to the mounting strip 43 by pushing the sealing strip 49 in the direction of arrow X towards the sealing strip 43. The inclined edges 60 of the head 47 cause the lips 56 to deform and slide along the inclined surfaces 60. Continued movement of the sealing strip 49 in the direction X eventually causes the lips 56 to pass under the head 47, whereafter they resile and clamp the sealing strip 49 securely to the mounting strip 43. To facilitate mounting of the sealing strip 49 over the head 47, the outer edges 62 of the lips 56 have inclination generally matching the inclination of the inclined surfaces 60 of the head 47. The inclined surfaces 62 of the lips 56 may be provided with a low friction surface 64 to further aid mounting of the sealing strip 49 on the mounting strip 43.

The mounting strip 43 is extruded to form a member which is rigid relative to the lips 56 to facilitate proper mounting of the sealing strip 49 to the mounting strip 43 and secure locating of the sealing strip once mounted.

The mounting strip 43 may be formed of PU (polyurethane) material.

Whilst in the second embodiment mounting strip 43 is shown as being T-shaped,

alternative configurations of the mounting strip could be employed, provided that they allow co-operation with a suitably shaped base of the sealing strip 49 so that the sealing strip 49 can be secured to the mounting strip 43.

The provision of the relatively rigid mounting strip 43 may improve the sealing around the door 4. Improved sealing may be provided when the sealing strip 49 is firmly compressed between the door periphery 9 and the door opening when the door 4 closes. To achieve this it is necessary for there to be a firm support surface on the opposite side of the sealing strip 49 to the door opening. Since the peripheral surface 9 of the door 4 is almost parallel to the direction of the compressive force, the door periphery 9 cannot itself provide this firm support surface, but it is provided by the mounting strip 43.

During extrusion of the sealing strip 37 or the mounting strip 43, means may be provided to regulate the temperature of the extrudate as it exits the port 17.

Whilst in the embodiments the fixing of a sealing or mounting strip to a vehicle door is described, it should be understood that the sealing or mounting strip may be fitted to any member, assembly or component in accordance with the invention. This may be a closure member.

CLAIMS

1. A method of forming a sealing or mounting strip on a member, the method including providing a fixed extrusion device for producing an extruded sealing or mounting strip, moving the member with respect to the fixed extrusion device, while operating the extrusion device to produce the extruded sealing or mounting strip, such that the sealing or mounting strip is formed along a desired path on the member.
2. The method of claim 1, wherein the member is a closure member.
3. The method of claim 2, wherein the closure member is a vehicle door.
4. A method according to claim 2 or 3, wherein the strip is a sealing strip and comprises a base portion in contact with the closure member and a compressible sealing portion for sealing against a frame of the opening closed by the closure member.
5. The method of claim 1, 2 or 3, wherein the strip is a mounting strip and comprises a fixing portion for co-operating with a corresponding portion of a sealing member for fixing the sealing member to the mounting strip.
6. The method of claim 5, wherein the fixing portion includes an enlarged head.
7. The method of claim 5 or claim 6, wherein the fixing portion is substantially T-shaped.
8. The method of claims 5, 6 or 7, wherein the mounting strip is formed of PU material.

9. The method of any one of the preceding claims, wherein the extrusion device is mounted on the floor or other fixed structure of a manufacturing plant.
10. The method of any one of the preceding claims, including controlling the temperature of extrudate from the extrusion device.
11. The method of manufacturing an assembly, the method including forming the main body portion of the assembly; mounting the assembly on movement apparatus and moving the assembly to respective processing stations, at each of which a manufacturing step of the assembly is performed, wherein at one of said processing stations a sealing or mounting strip is formed on the assembly by a fixed extrusion device, and, while operating the extrusion device to produce the extruded sealing or mounting strip, the sealing or mounting strip is formed along a desired path on the assembly by controlled movement of the closure member with respect to the fixed extrusion device by the movement apparatus.
12. The method of claim 10, wherein other of said processing stations include a station where the assembly is painted.
13. The method of claim 11 or 12, wherein other of said processing stations include a station where further components are fitted to the assembly other than by means of extrusion.
14. The method of claim 11, 12 or 13, wherein the assembly comprises a vehicle closure member.
15. The method of claim 14, wherein the closure member is a vehicle door.
16. A method according to claims 14 or 15, wherein the strip is a sealing strip and

comprises a base portion in contact with the closure member and a compressible sealing portion for sealing against a frame of the opening closed by the closure member.

17. The method of claims 11, 12, 13, 14 or 15, wherein the strip is a mounting strip and comprises a fixing portion for co-operating with a corresponding portion of a sealing member for fixing the sealing member to the mounting strip.
18. The method of claim 17, wherein the fixing portion includes an enlarged head.
19. The method of claim 17 or claim 18, wherein the fixing portion is substantially T-shaped.
20. The method of claims 17, 18 or 19, wherein the mounting strip is formed of PU material.
21. The method of any one of claims 11 to 20, wherein the extrusion device is mounted on the floor or other fixed structure of a vehicle manufacturing plant.
22. The method of any one of claims 11 to 21, including controlling the temperature of extrudate from the extrusion device.
23. Apparatus for forming a sealing or mounting strip on a member, the apparatus including a fixed extrusion device and moving means onto which the is mounted in use for moving the with respect to the fixed extrusion device such that the strip is formed along a desired path on the member.
24. The apparatus of claim 23, wherein the member is a closure member.

25. The apparatus of claim 24, wherein the closure member is a vehicle door.
26. The apparatus according to claim 24 or claim 25, wherein the strip is a sealing strip and comprises a base portion in contact with the closure member and a compressible sealing portion for sealing against a frame of the opening closed by the closure member.
27. The apparatus of claims 23, 24 or 25, wherein the strip is a mounting strip and comprises a fixing portion for co-operating with a corresponding portion of a sealing member for fixing the sealing strip to the mounting member.
28. The apparatus of claim 27, wherein the fixing portion includes an enlarged head.
29. The apparatus of claim 27 or claim 28, wherein the fixing portion is substantially T-shaped.
30. The apparatus of claims 27, 28 or 29, wherein the mounting strip is formed of PU material.
31. The apparatus of any one of claims 23 to 30, wherein the extrusion device is mounted on the floor or other fixed structure of a manufacturing plant.
32. The apparatus of any one of claims 23 to 31, including means for controlling the temperature of extrudate from the extrusion device.
33. The apparatus of any one of claims 23 to 32, wherein the moving means also is operable to move the member between respective processing stations in a manufacturing plant.

34. A method of forming a sealing or mounting strip on a member, a method of manufacturing an assembly or apparatus for forming a sealing or mounting strip on a member, substantially as hereinbefore described with reference to and/or substantially as illustrated in any one of or any combination of the accompanying drawings.

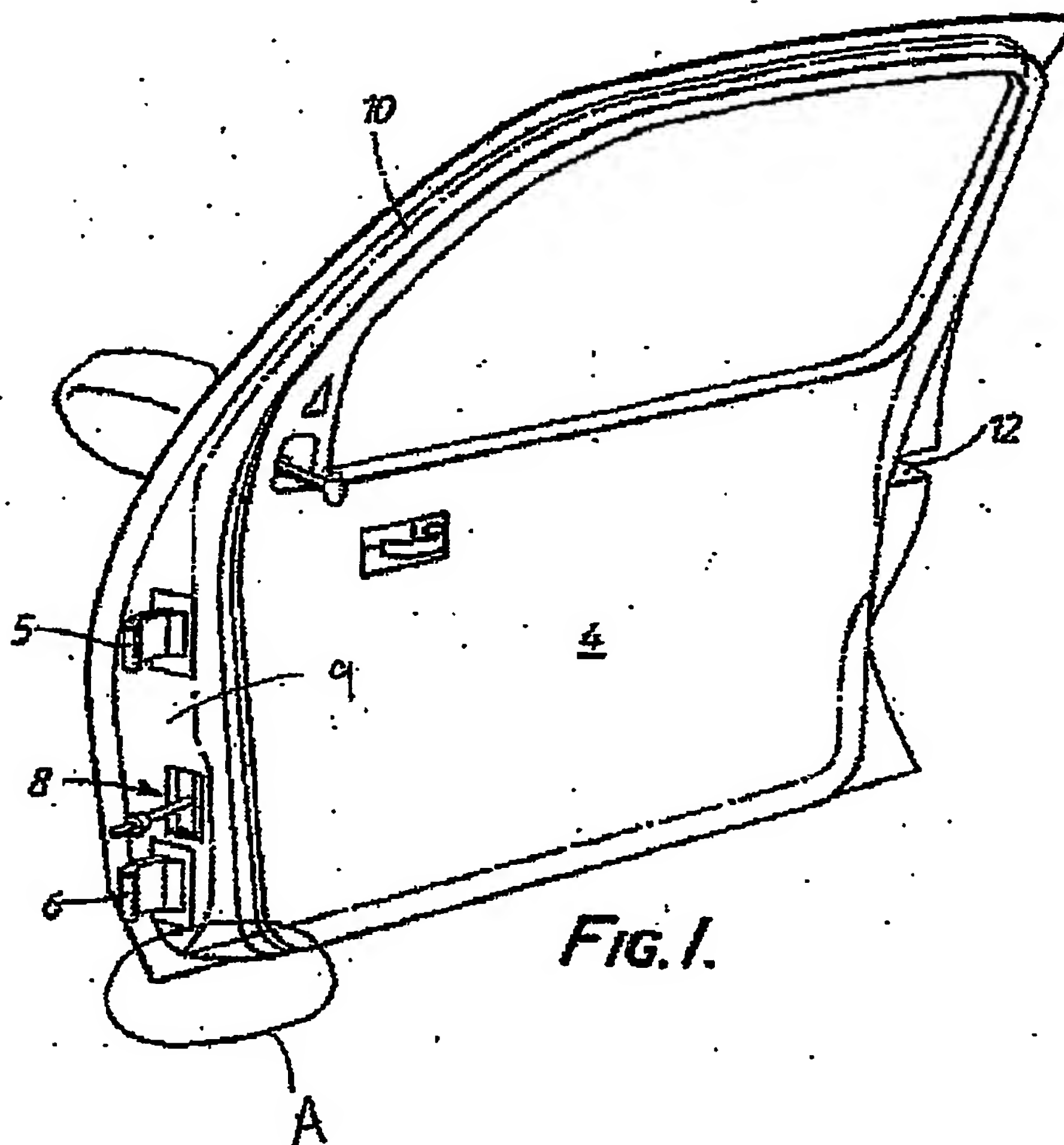
14

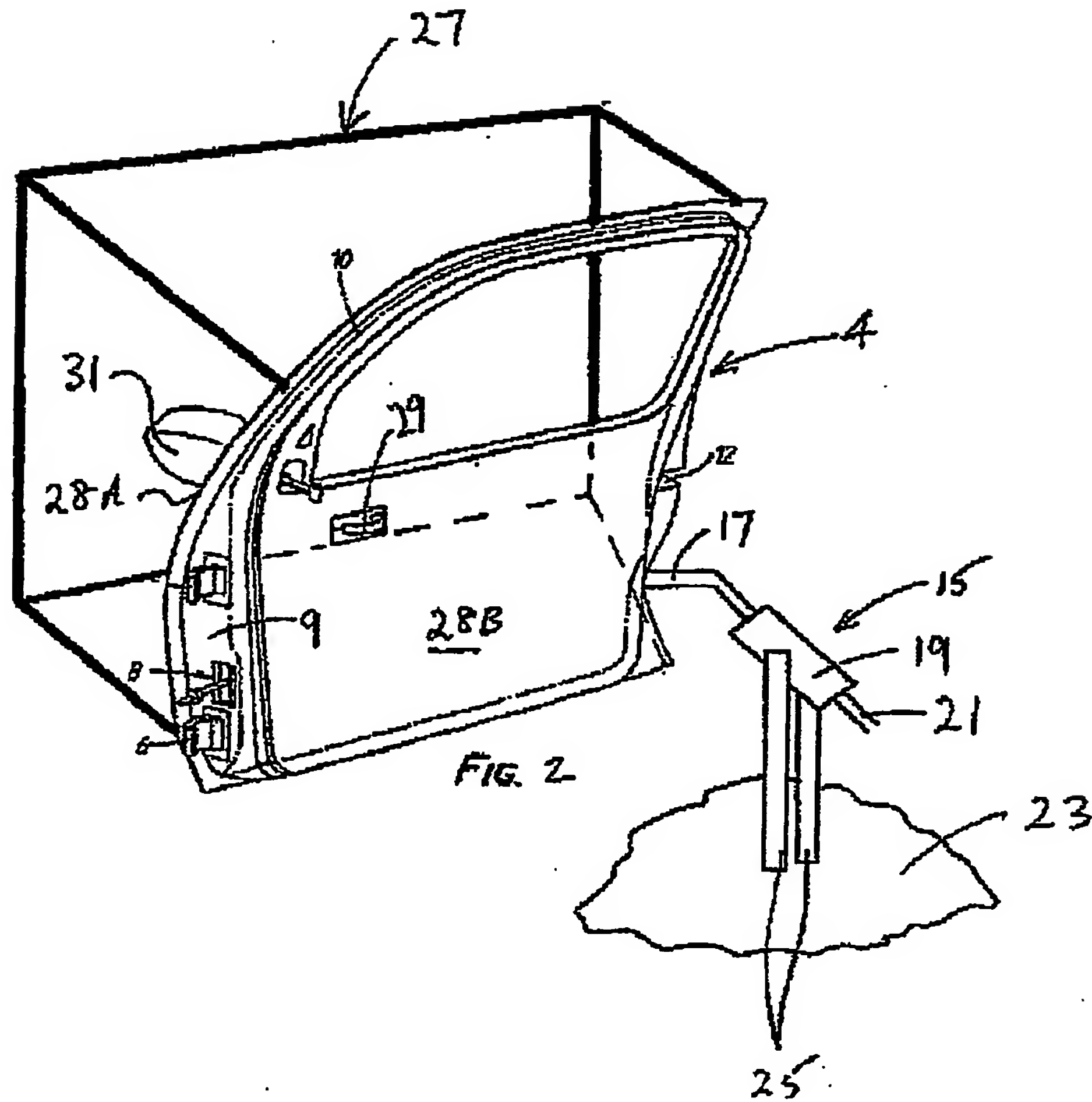
ABSTRACT**FIXING OF SEALING AND MOUNTING STRIPS
TO MEMBERS**

A method of forming a sealing or mounting strip on the periphery of a vehicle door 4 is disclosed. The method includes providing a fixed extrusion device 15 for producing an extruded sealing or mounting strip, moving the door 4 with respect to the fixed extrusion device 15, while operating the extrusion device 15 to produce the extruded sealing or mounting strip, such that the sealing or mounting strip 10 is formed along a desired path 10 on the door 4. The door 4 is mounted in a frame 27 which clamps the door 4 around the door's edge. The frame 27 is movable by any suitable means, such as by a robot typically used in automated vehicle fabrication plants. By making use of the frame 27 and movement means already provided in a conventional automated vehicle fabrication plant, little or no additional cost is incurred by providing for movement of the door 4 with respect to the fixed extrusion die 15.

[Figure 2]

1/5



$$2/5$$


3/5

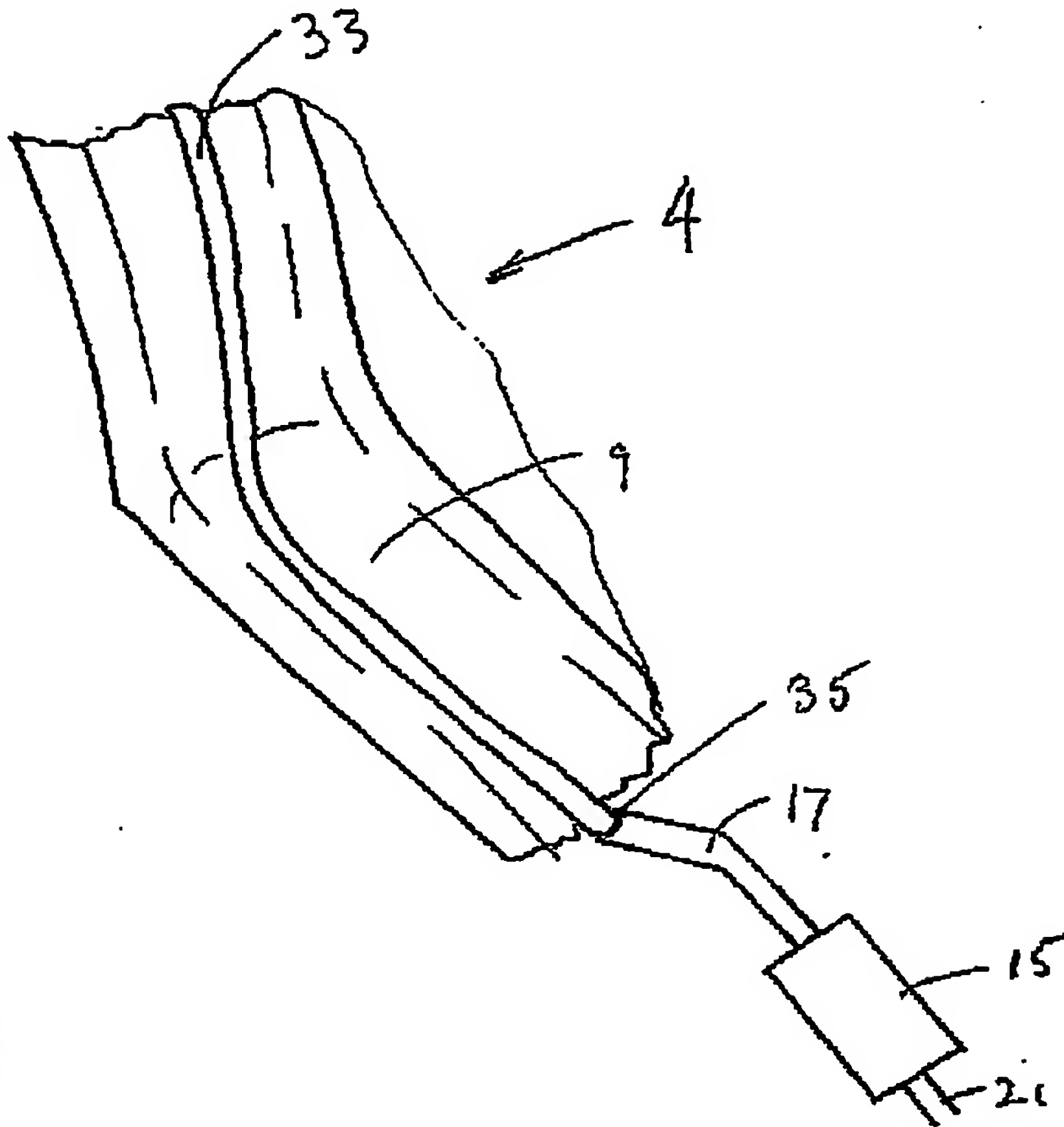


FIG. 3

4/5

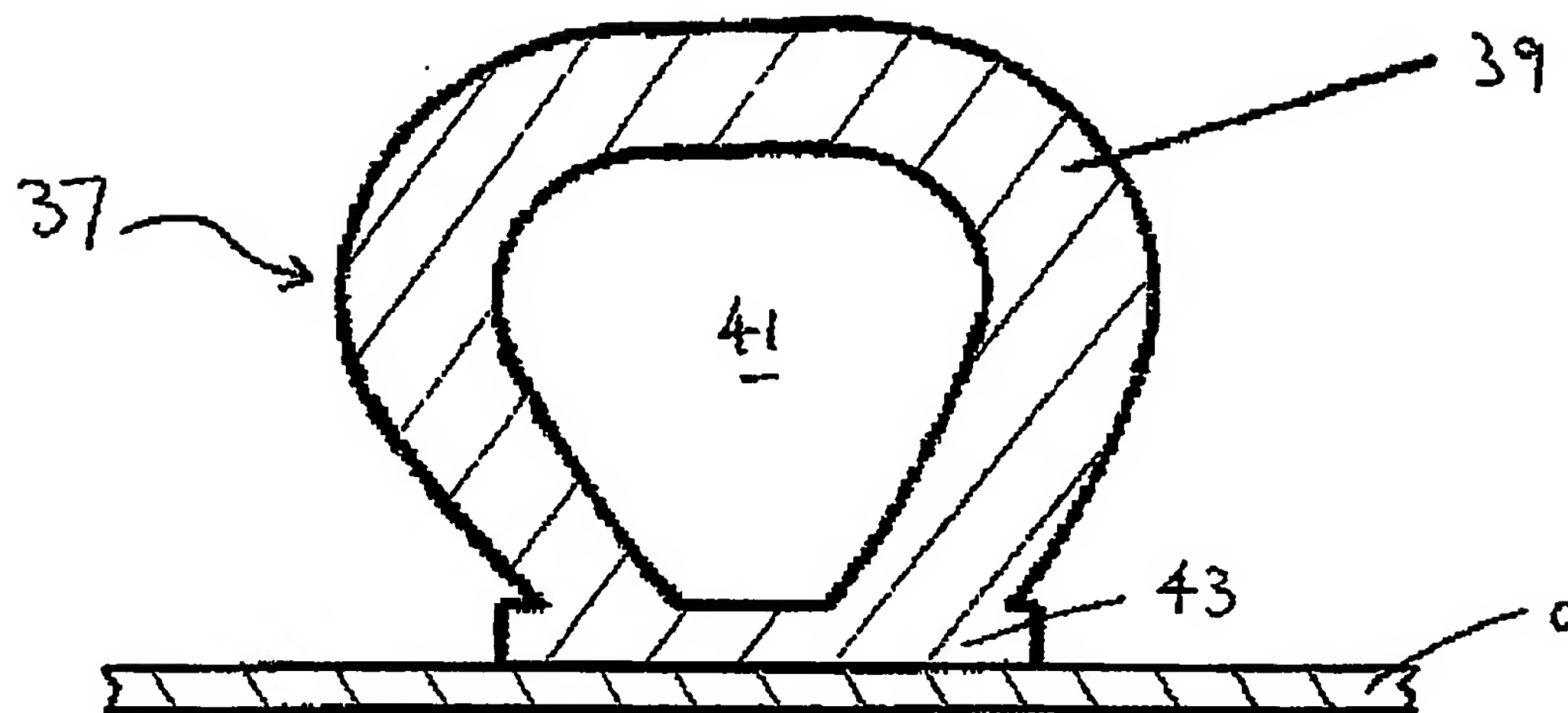
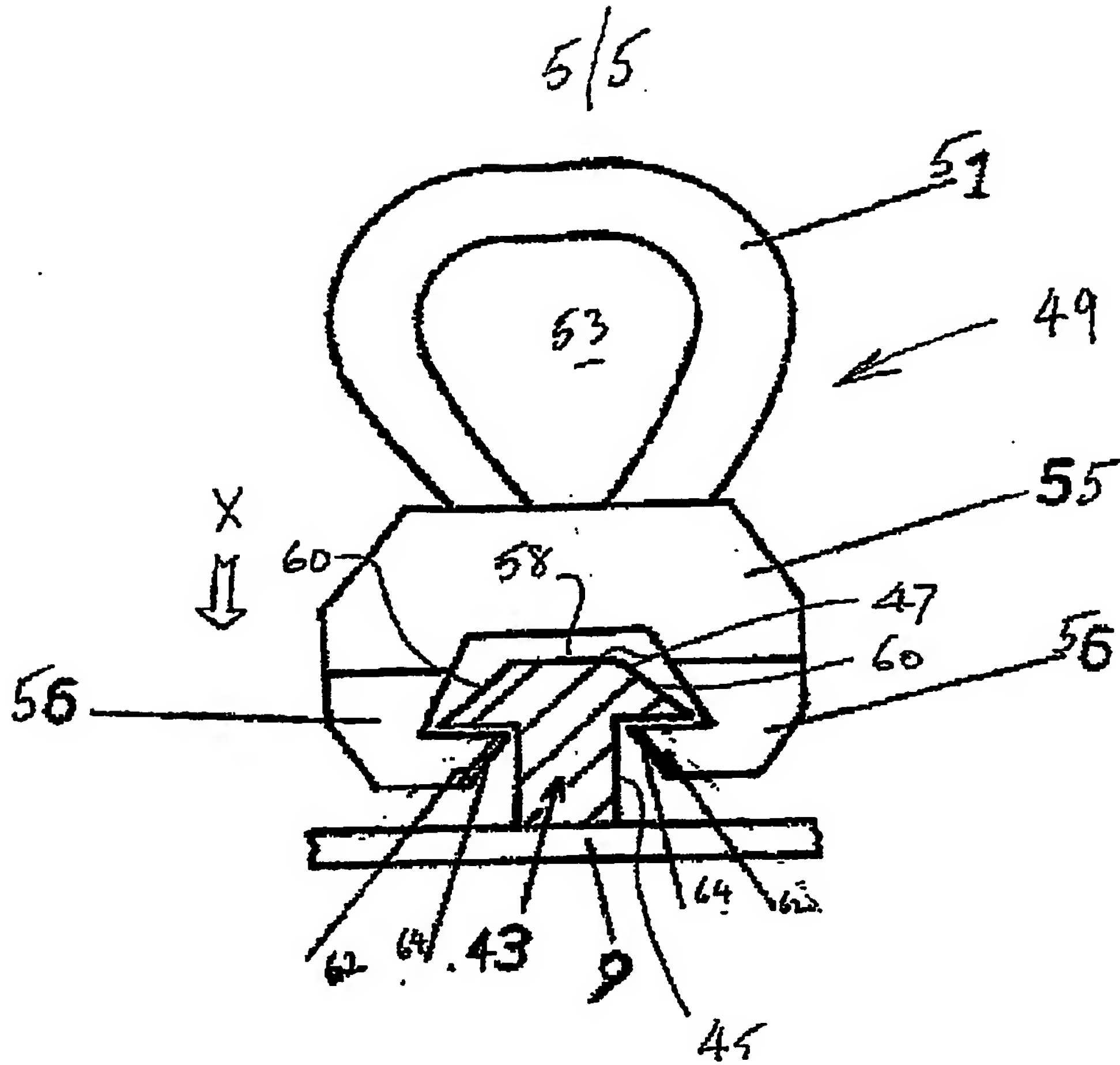
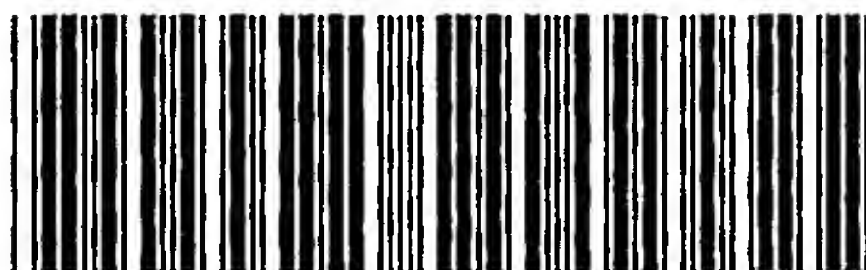


Fig. 4



PCT Application
IB0305917



This Page is inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ BLACK BORDERS
- ☒ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☒ COLORED OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☒ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REPERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images
problems checked, please do not report the
problems to the IFW Image Problem Mailbox**